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ABSTRACT

A Title III open classroom project was run in Wayne, New Jersey, in grades 1-3 in one elementary school and grades 1-5 in a second. After one year of the program, comparisons with grades 1-5 of a matched control school in the same community were made. Open classroom teachers were found to be more flexible in their use of space and organization of classroom activities, more creative, more warm and accepting. Pupils did not differ on achievement or problem solving, but open classroom children had more positive self-appraisals and attitudes toward school than control children. Open classrooms were concluded to be effective in many respects. (Author)

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Evaluating The Open Classroom

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Within the past few years an increasing number of schools have adopted informal teaching methods. Open education, the current phrase used to describe such methods, has been largely adopted by the British in their primary schools (Rogers, 1970).

During the 1971-72 school year two schools in the Wayne, New Jersey School District engaged in a program known as Project: Open Classroom (POC). The purpose of this project was to develop a changeover model from formal to informal teaching methods. The major focus during this initial year was staff development.

The Problem

This study was conducted to assess the extent to which POC classrooms differed from control classrooms with respect to teaching process, i.e., the behavior of teachers, and teaching product, i.e., the outcomes of students.

Some Relevant Literature

Open education is going through a period of identity formation in the United States. At present there are no defined criteria which makes a classroom open; however, the literature does show some consistencies among the descriptive accounts of how "open" teachers arrange the learning environment and what they do in that environment.

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Joseph Featherstone (1971) reports that open classrooms are flexibly arranged. They are divided into learning centers to provide for the simultaneous occurrence of several activities. Students are not limited to their seats to work, nor does the teacher remain in a fixed teaching area.

Lillian Weber (1971) reports that in many British primary classrooms, after which many American open classrooms are modeled, there is simultaneous use of the environment. That is, at any given time in these classrooms more than one child will be using more than one element of the environment to learn. This is in direct contrast to the "whole class" teaching which is characteristic of more formal methods.

Open educators advocate a more flexible organization of subject matter. Instead of being organized around time blocks, the environment is carefully prepared by the teacher and students select from it as their interest or needs dictate (Central Advisory Council for Education, 1967).

Joy Schlesinger, an observer of open education, reports that in open classrooms students are not treated as a monolithic unit. Their individual needs are considered by various sized groups. Ad hoc groups are formed, then quickly disbanded (Center Advisory Council for Education, 1967).

Brant (1972) found that the role of the teacher in British infant schools is active. He reports that the teacher spends less than one-fourth of her time presenting large group lessons. It is more likely that she will be talking with individuals or small groups. This is in contrast to the well documented finding in the United States that teachers talk between 65-75% of the time and that the talking is mainly to groups (Hughes, 1959).

It is the teacher who sets the tone of the environment (Medley and Mitzel, 1963; Soar, 1972). This has been the assumption behind most research on classroom process. This premise seems to be operable in the open classroom as well as regular classrooms (Brant 1972; Central Advisory Council for Education, 1967).

There are virtually no empirical studies of the open classroom which have assessed its critical elements (Brant, 1972; Walberg and Thomas, 1972). This study took some of the characteristics which have been derived in the descriptive literature and assessed them empirically.

Statement of the Hypotheses

Process Hypotheses

1. Teachers in POC classrooms will significantly exceed teachers in control classrooms on
   a. The flexibility of their arrangement and utilization of space as measured by the Flexible Use of Space Scale;
   b. Their diversity of similtaneous student activity, as measured by the Student Activity Measure;
   c. Their diversity of student grouping, as measured by the Grouping Measure;
   d. The student-centeredness of their verbal interaction patterns with students as measured by the Bellack System;
   e. Their creativity, dynamism, organized demeanor, and warmth and acceptance as measured by the Tuckman Teacher Feedback Form.

Product Hypotheses

2. Students in POC classrooms will significantly exceed students in control classrooms on
   a. higher cognitive ability, as measured by performance on the Classification Task;

b. attitudes toward self, as measured by the Self-Appraisal Inventory;
c. attitudes toward school, as measured by the School Sentiment Index.

3. Students in POC classrooms will not differ significantly from students in control classrooms on
   a. achievement, as measured by the California Achievement Test.

Methods

Subjects

Three schools in Wayne, New Jersey were involved in this study: in POC School 1 teachers in grades 1-3 received the treatment; teachers in grades 4-5 did not. All teachers in grades 1-5 in POC School 2 received the treatment. No teachers in the Control School received the treatment. Of the 47 classrooms in the three schools, 28 received the treatment. To compensate for the disproportionality of POC vs. Control classrooms, two randomly selected classrooms were observed at each grade in each school. (See Table 1.) Student data were also drawn from the same 30 classrooms. (Student equivalence on initial IQ across the three schools was established as a prerequisite to control school selection.)

Table 1 Distribution of Classrooms by School and Grade Level.

Grade Level	POC School 1		POC School 2		Control School	
1	POC (3)	2	POC (4)	2	Control (2)	2
2	POC (3)	2	POC (4)	2	Control (2)	2
3	POC (3)	2	POC (4)	2	Control (2)	2
4	Control (4)	2	POC (3)	2	Control (2)	2
5	Control (5)	2	POC (4)	2	Control (4)	2

(#) = number of classrooms available
\# = number of classrooms in study

Independent Variable

The POC treatment was primarily in-service training and supervision conducted by a staff and group of consultants familiar with the underlying beliefs and organization of open education. The treatment consisted of: 1) a three-week trip to England to study the British infant school, 2) a summer

workshop 3) consultant visitations during the year 4) in-servic workshops, and 5) classroom visitations and consultations with the POC staff.

Dependent Variables

1. Arrangement and Utilization of Space. The observer rated the flexibility and unconventionality of the arrangement and use of desks, floors, walls, ceilings, display areas, and partitioned areas, as well as teacher and pupil movement on the three point Flexible Use of Space Scale, an impression recording instrument designed for this evaluation.

2. Simultaneous Use of the Environment. The activity in which each student was engaged and the subject matter he was pursuing were recorded on the Student Activity Measure. Four students from each classroom were randomly selected for observation. Scores ranged from 4 (when each student was doing something different) to 1 (where each student was doing the same thing).

3. Classroom Grouping Patterns. Data regarding group size and the nature of the conditions for collaboration were collected using the Grouping Measure. The same students sampled for the Student Activity Measure were used. Similarly the 4 to 1 scale indicated the degree of group diversity (with four showing the presence of four different size work groups and one indicating the same size work group in each instance).

4. Verbal Interaction Patterns. Two twenty minute tape recordings of teachers were made using a wireless microphone system. A five-minute section of each recording was coded using selected dimensions of the Bellack System to determine the extent to which verbal interaction differed in POC and Control classrooms.

5. Teacher Creativity, Dynamism, Organized Demeanor, and Warmth and Acceptance. The Tuckman Teacher Feedback Form (Form B) was used to record the observer's overall impressions of the teacher's behavior. Each of the four dimensions considered is represented by seven paired adjectives, each on a seven point semantic differential scale.

6. Higher cognitive processes. The Classification Task was put together for this evaluation. It included a concept attainment task and an evaluation task, each with four-dimensional blocks (color, shape, size, surface). In the first they had to find the "correct" block in the fewest trials; in the second, they had to remove non-examplars from a set. Scores on the two tasks were averaged. (A K-R reliability of .62 on the combined tasks was obtained.)

7. Attitudes toward self. The Self-Appraisal Inventory, Intermediate (Grades 4-5) and Primary (Grades 1-3) Forms were used as they appear in the publication: Measures of Self Concept K-12, put out by the Instructional Objectives Exchange (IOX), Box 24095, Los Angeles, California 90024. The manual reports K-R reliabilities of .87 and .37 for these instruments. In this study K-R reliabilities of .89 and .76 were obtained. These instruments are self-report attitude measures with yes-no response options. The Intermediate Form is self-administered while the Primary Form is designed for group administration using a picture-coded answer sheet.

8. Attitudes toward school. The School Sentiment Index, Intermediate and Primary Forms, were used as they appear in the publication: Attitude Toward School K-12, put out by the Instructional Objectives Exchange. These instruments have essentially the same format as those described above for attitudes toward self. The manual reports K-R reliability coefficients of .80 and .72 for the two forms used. In this study reliabilities of .89 and .77 were obtained.

9. Academic achievement. For grades 2 through 5, the California Achievement Test was used to measure achievement. Specifically, Reading, Math, Language, and Total scores were analyzed. In grades 3-5 the CAT was given on a pretest-posttest basis while in the 2nd grade it was given on a posttest basis only. For 1st graders, the ETS Primary Test Battery was used. However, major problems in administration were encountered with the first grade test since teachers had never worked with this instrument before.

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Procedures

The 30 classrooms were each observed on two occasions during April and May, 1972 for at least 20 minutes each time by one or both of two trained observers. Dual observations were made to establish inter-rater reliability. (Reliabilities are shown in Table 2).

Table 2

Inter-Rater Reliabilities on the Process Measures

Flexible Use of Space Scale		.78
Student Activity Measure		1.00
Grouping Measure		1.00
TTFF:	Creativity	.75
	Dynamism	.68
	Organized Demeanor	.22
	Warmth & Acceptance	.53
	Bellack Categories	.45 - .95

Data Analysis

The data on the teacher measures were analyzed using the Kruskal-Wallis one way analysis of variance by ranks. Separate analyses were performed for grades 1-3 and 4-5 by school. Similarly grades 1-3 and 4-5 were analyzed by grades. (See Table 1).

The data on the student measures were analyzed by means of analysis of variance or analysis of covariance, except for the data from the Classification Task which were analyzed by Kruskal-Wallis.

Results

Process Hypotheses

Table 3 indicates the results of the tests of significance on the process measures. The tests were performed by school and by grade at grades 1-3 and 4-5. The general lack of significant differences between grade levels and the trend toward significant differences between schools, supports the conclusion that such differences are due to the treatment, i.e., that the training procedure produced effectively open classrooms. (The treatment effect is represented by a "school" effect - see Table 1.)

Table 3

Results of the Analyses of Variance Between Treatment and Control by School and Grade Level (Kruskal-Wallis One Way Analysis of Variance by Ranks). (Numbers represent p values)

	Schools		Grades	
	Grades 1-3	Grades 4-5	Grades 1-3	Grades 4-5
Flexible Use of Space	.01*	.30	.50	.14
Diversity of Student Activity	.21	.05*	.60	.90
Subject Matter	.25	.03*	.60	.70
Activity	.30	.05*	.50	.40
Diversity of Grouping/ Initiator	.50	.08**	.90	.50
Grouping	.50	.09**	.80	.90
Initiator	.95	.30	.95	.21
Teacher Style				
Creativity	.15	.90	.30	.01*
Dynamism	.80	.16	.40	.90
Organized Demeanor	1.00	.30	.80	.95
Warmth and Acceptance	.02*	.95	.90	.14
Verbal Interaction				
T/Structuring	.30	.11	.30	.60
T/Soliciting	.19	.50	.98	.70
T/Responding	.09**	.04*	.70	.30
T/Reacting	.05*	.07**	.90	.80
Verbal Interaction				
P/Structuring	.50	.80	.17	.09**
P/Soliciting	.90	.03*	.70	.70
P/Responding	.30	.16	.50	.80
P/Reacting	.50	.03*	.30	.30
Total T/Moves	.40	.03*	.60	.90
Total P/Moves	.30	.03*	.70	.90
Total Avg. Moves	.30	.70	.18	.30
Classification Task	.85	.90		

* p. $<$ .05
** p. $<$ .10

At grades 1-3 significance was achieved in the (1) flexible use of space, (2) warmth and acceptance of the teacher, and (3) teacher responding and reacting. At grades 4-5 significant differences occurred in (1) similtaneous student activity, (2) student grouping patterns, (3) teacher responding and reacting, (4) pupil soliciting and reacting and, (5) total teacher moves and total pupil moves.

The results show three major changes which have occurred due to the effect of the treatment at grades 1-3. POC classrooms have undergone a physical transformation. They are not traditionally arranged or utilized. POC classrooms tend, as hypothesized, to be more organized around learning centers.

Students do not work in large groups or whole class units as in the control classroom. Teachers generally are found interacting with small groups or individuals.

The Bellack finding (Hypothesis ID) indicates that teachers in POC classrooms do more responding to pupils' questions and give more reaction to their responses. All other aspects of their dialogue were similar to control classrooms.

The third area of significance is the warmth and acceptance of the teacher. POC teachers tended to display behavior which is more patient, gentle, accepting, warm, amiable, social, and fair than control teachers.

While some classroom environment changes were evident at grades 4-5, the most notable differences were in the student activities and grouping patterns. In POC classrooms there was a greater diversity of simultaneous activity than in control classrooms. POC students were pursuing more topics in a broader variety of ways than control students. Similarly POC students were pursuing learning through a variety grouping patterns.

While significance was found in some dimensions of the Bellack System, not all of the findings were in behalf of the POC classrooms. Teacher's responding to student's questions were more frequent in control classrooms. Similarly teacher's reactions were more frequent in control classrooms.

Pupils tended to ask more questions in one of the control schools and the POC school. The same was true of pupil reacting.

In grades 4-5 teachers talked significantly more and pupils significantly less in control classrooms than in POC classrooms.

Product Hypotheses

The results on the clsssification task also appear in Table 3. Clearly students in both treatment and control classrooms performed equally well on this task. However, the fact that a number of students attained the ceiling on this task casts some doubt on the appropriateness of this measure.

Results on attitudes toward self and school appear in Table 4.

The table provides the following findings:

1) In grades 1-3, the Open Classroom approach has led children to have more positive attitudes toward themselves in one of the two treatment schools while it has had no effect in grades 4-5;

2) In grades 1-3 and 4-5 the Open Classroom approach has led children to have more positive attitudes toward school (that is, students in open classrooms liked school more than students in traditional classrooms).

Thus, it was concluded that Open Classrooms produce more positive affective effects than do traditional classrooms. Obviously changes in teacher behavior are being transformed into changes in student outcomes.

The results on achievement are shown in Table 5. Of the 16 comparisons, nine resulted in significant differences. Of the nine, three were based on inferior performance in one of the treatment schools (2nd grade reading in one of the two POC schools, 3rd grade language in both POC schools, and 3rd grade total score in the other of the two POC schools). Of the nine, two were based on a superiority in a POC school (in 2nd grade math and total), and four were based on an inferiority in one of the control schools (in all four areas in the 4th grade). The net effect is for no clear pattern to have emerged. Overall, it was concluded that standardized achievement was unaffected by the switch to open classroom; it was neither improved nor retarded. (Note, however, the great extent to which students in all instances were performing above grade level.)

Table 4

Results of the Analysis of Variance and Means on the Measures of Attitudes Toward Self and Attitudes Toward School

	Attitudes Toward Self						Attitudes Toward School					
	Grades 1-3			Grades 4-5			Grades 1-3			Grades 4-5		
Source	df	MS	F	df	MS	F	df	MS	F	df	MS	F
School	2	263	8.4*	2	191	1.7	2	226	10.5*	2	860	7.9*
Grade	2	10	1	1	999	8.7*	2	158	7.3*	1	2278	20.8*
S x G	4	107	3.4	2	7	1	4	80	3.7	2	781	7.1**
Error	369	31		270	114		387	22		270	109	

*p < .01

Attitudes Toward Self

Grades 1-3

POC_1	POC_2	Control
28.9	26.3	26.5

Attitudes Toward School

Grades 1-3

POC_1	POC_2	Control
21.2	20.5	18.7

28

Attidutes Toward Self

Grades 4-5

POC	$Control_1$	$Control_2$
56.8	55.4	58.3

Attitudes Toward School

Grades 4-5

POC	$Control_1$	$Control_2$
53.1	47.2	48.6

First grade achievement data have not been presented in tabular form. Teachers reported difficulty in testing at this level particularly with an unfamiliar test. Many problems and inconsistencies were reported. The results showed that control classrooms significantly out-achieved treatment classrooms in two of four areas. This finding must be evaluated in the light of test administration inconsistencies.

Discussion

It seems that along with a physical change of the environment in grades 1-3 has come a change in teacher behavior and a change in student attitudes. The nature of the rooms are such that interaction with large groups is virtually impossible. This has forced the teacher to interact with individuals and to organize classroom instruction so that individuals can react with one another. This has been coupled with, and hence presumably led to, an increase in children's perception of self worth and their liking for school.

When a teacher talks with an individual, her manner is much more personable than when she talks with large groups. This significant increase in warmth and acceptance coupled with an increased use of small group and individual instruction is probably the essential change that has occurred.

The occurrence of several activities and the meeting of several groups simultaneously seems to be a basic feature of instruction in the lower grades. This is borne out by the occurrence of high scores for both POC and control classrooms on SAM and GM. The difference seems to be in the organization to carry out simultaneous use of the environment. Open classrooms use the learning center approach; control classrooms use grouping and seatwork.

There are basic differences in student activity and grouping patterns at grades 4-5. POC classrooms tended to engage in more diverse activities and grouping patterns than their control counterparts. Control classrooms were more likely to be found in a whole class pattern or large group instructional pattern led by the teacher.

These new patterns do not seem to affect achievement but they do seem to cause students to like school more. They must provide for more pleasant learning activities. Moreover, the increased self-reliance would seem to be contributing to students beginning to see themselves in more positive terms. The achievement of a positive self-image is an important goal in education in its own right, and one which educators have been talking about but rarely measuring. While not affecting achievement to any measurable degree, the Open Classroom treatment has enhanced students' self-images and liking for school, thus indicating one value of a student-centered classroom approach.

Table 5

Adjusted Mean Grade Equivalent Scores and Results of the Analyses of Covariance on the Achievement Posttest

		POC_1	POC_2	Control
	Read	3.3*	3.8	3.7
	Math	3.1	3.5*	3.2
2nd	Lang	3.5	3.7	3.7
grade	Total	3.1	3.5+	3.3
	Read	5.1	4.9	5.1
	Math	4.7	4.5	4.4
3rd	Lang	5.4	5.0	5.9+
grade	Total	4.9	4.6*	4.9

		$Control_1$	POC	$Control_2$
	Read	5.6*	6.0	6.3
	Math	5.4*	5.8	6.3
4th	Lang	6.1*	6.5	6.9
grade	Total	5.5*	5.9	6.3
	Read	7.8	7.4	7.4
	Math	6.8	6.8	6.7
5th	Lang	7.6	7.5	7.4
grade	Total	7.1	7.0	7.0

* Significantly different from other two means, $p < .01$
\+ Significantly different from lowest mean, $p < .01$

Means in grades 3-5 were adjusted by pretest scores on the achievement test.
Means in grade 2 were adjusted by IQ score.

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